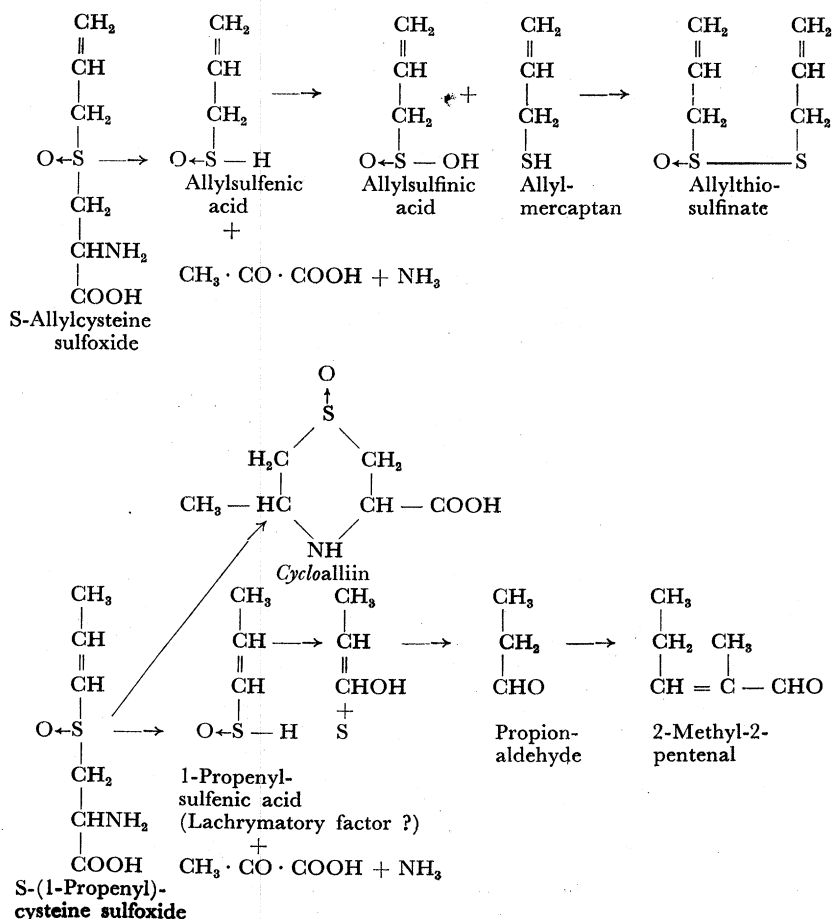


On the Enzymic Splitting of S-(1-propenyl)-cysteine Sulfoxide and the Formation of the Lachrymatory Factor

In our studies on the chemical composition of onion, the very interesting compound, S-(1-propenyl)-cysteine sulfoxide, was isolated in crystalline form¹. It turned out to be the precursor of the lachrymatory factor in onion. *Cycloalliin* is formed spontaneously from it even in a slightly alkaline medium¹. It is a component of γ -glutamyl-S-(1-propenyl)-cysteine sulfoxide², of which there is a relatively large amount in onion. Since propionaldehyde is formed spontaneously from the lachrymatory factor, which is a very unstable compound, and since small amounts of 2-methyl-2-pentenal^{3,4} are further formed from propionaldehyde, S-(1-propenyl)-cysteine sulfoxide is the precursor of many different substances, and hence a central sulfur compound in onion.

The chemical characterization of the lachrymatory factor proved to be difficult because of its short life. Owing to the fact that an aqueous solution of S-(1-propenyl)-cysteine sulfoxide after enzymic splitting had no notable antimicrobial effect as the thiosulfinate formed from S-allylcysteine sulfoxide has, it seemed that no propenylthiosulfinate is formed and that the primary decomposition product, propenylsulfenic acid, could be the lachrymatory factor. The enzymic splitting of S-allylcysteine sulfoxide and S-(1-propenyl)-cysteine sulfoxide would then take place in the following way:



The above views were presented by one of us (AIV) in a lecture delivered at a conference on organic sulfur compounds in Natick, Mass. on the 12th of October, 1961.

This investigation is a part of a research project under U.S. Public Law No. 480, 83rd Congress.

References

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